REMARKS

Claims 1, 3, 5, 10-12, 25-26, 41-44, 45, 49, 62, 82, 117, 120, 122-125, 129, 132, 143, 146, 147, 148, 153-160 are pending in the application present application. Claims 41, 44, 45, 49, 62, 82, 117, 120, 122-125, 129 and 132 are hereby withdrawn. Claims 1, 25, 26, 147, 153 and 154 stand rejected under 35 U.S.C. Section 102(b). Claims 3, 5, 10-12, 143, 146, 148 and 155-160 stand rejected under 35 U.S.C. Section 103(a). Claims 147 and 148 are cancelled.

The Examiner has rejected Claims 1, 25, 26, 153 and 154 under 35 U.S.C. Section 102(b) as being anticipated by International Patent Application WO 91/15719 (Huston). In light of the amendments to the claims and the arguments made below the Applicant respectfully traverses the rejection.

The Applicant's invention as recited in the claims is a method for modifying the atmosphere within a chamber, such as a shipping container, so that respiring produce stored in the chamber will deteriorate more slowly than in the ambient atmosphere. During operations oxygen levels are monitored while carbon dioxide levels are not monitored. As part of the monitoring process, the oxygen level in the chamber is maintained at a fixed value. The oxygen level is controlled by periodically measuring the oxygen level, and if it is to low, admitting ambient air into the chamber to increase this level. Atmosphere is allowed to exit the chamber to maintain approximately ambient pressure.

As was mentioned above, the desired chamber atmosphere is maintained without the monitoring of carbon dioxide levels. In this situation a certain amount of carbon dioxide absorbent material is placed in the chamber which absorbs carbon dioxide from the chamber atmosphere at a known rate to produce a desired carbon dioxide equilibrium level.

Huston discloses a system for controlling the atmosphere in a produce storage room which requires active control of both the oxygen and carbon dioxide concentrations. In particular, the described system includes a carbon dioxide sensor which detects carbon dioxide concentration within the storage room. If the carbon dioxide content exceeds a set point, the system detects this and the carbon dioxide is removed by activating a carbon dioxide scrubbing device. Once the carbon dioxide content falls below the set point, the carbon dioxide system is deactivated.

The Applicant's system is not anticipated by the reference because Huston does not teach an atmosphere control system which maintains carbon dioxide equilibrium through the removal of carbon dioxide at a steady rate in the absence of carbon dioxide monitoring. As was described in the present application, the use of carbon dioxide sensors is a complicated and expensive way for controlling the atmosphere in a storage chamber. The Applicant's have recognized that instead of employing a carbon dioxide sensor and then periodically activating a carbon dioxide removal mechanism, the amount of carbon dioxide built up in the chamber may instead be predicted beforehand and then through positioning of a selected amount of carbon dioxide removal materials in the chamber prior to use, the carbon dioxide may be removed at a predetermined rate to maintain equilibrium. As such, the only monitoring employed in the Applicant's system is for oxygen, and the only actions performed during the system operation is the opening and closing of a small inlet opening and the activation and deactivation of a fan to drive air into the chamber and provide for its exit therefrom.

As mentioned above, the system and method described in Huston require the active monitoring of carbon dioxide as well the activation and operation of a carbon dioxide scrubbing mechanism when the carbon dioxide levels are above a preset limit. What is not described in

Huston is a system and/or method for carbon dioxide removal which does not require monitoring of carbon dioxide levels and without this monitoring provides for the removal of carbon dioxide at a predetermined rate so as to maintain a described equilibrium. Because the cited reference does not teach the steps of maintaining of carbon dioxide content without active monitoring of carbon dioxide concentration, the Examiner's rejection under 35 U.S.C. Section 102(b) is respectfully traversed.

The Examiner has rejected Claims 3, 5, 10-12, 143, 146, 148 and 155-160 under 35 U.S.C. Section 103(a) as being unpatentable over Huston in view of European Patent Application No. EP 353021, PCT Application WO 95/05753 (Bishop), Japanese Patent Application No. JP2-82083 (Fukuda) and European Patent Application No. EP 136042 (Lovegrove et al.). In light of the amendments to the claims and the arguments made below the Applicant respectfully traverses the rejection.

Samuel discloses a method of storing and transporting respiring comestibles. The system described in this reference incorporates both active monitoring of oxygen and carbon dioxide concentration. In particular, carbon dioxide levels are maintained through detection of carbon dioxide above a set point and then activation of a carbon dioxide scrubbing mechanism.

Bishop discloses a system for controlling atmosphere in a produce storage room. According to this system, the oxygen concentration in the chamber can be reduced by purging it with nitrogen, and carbon dioxide is actively controlled by a scrubbing until the system determines that the carbon dioxide concentration has dropped to a desired level. This control of carbon dioxide concentration is done through carbon dioxide level detection.

Fukuda discloses a system for maintaining a nitrogen rich condition for food storage. The system includes an oxygen sensor and an apparatus for purging the food storage chamber with nitrogen gas when oxygen levels exceed a predetermined set point.

Lovegrove et al. discloses a method and system for transporting a quantity of comestibles. The described system includes the functionality for measuring both oxygen and carbon dioxide content in the storage chamber. Based on the measured volume of carbon dioxide, a scrubber may be activated to reduce the carbon dioxide content to a desired level.

The applicant's invention is non obvious in light of the art cited by the Examiner because none of the cited references, either alone or in combination, teach or suggest a storage system in which carbon dioxide levels are maintained without carbon dioxide monitoring. In essence there is no suggestion in Huston or the other references cited by the Examiner that the processes for maintaining a desired atmosphere in a container could be carried out without constant carbon dioxide monitoring.

In the references cited by the Examiner there is no realization that the carbon dioxide level in a chamber containing respiring produce can be adjusted by attending only to the set point of oxygen in the chamber (as explained on Page 7, Line 20 to Page 8, Line 12 of the application). To operate the process of the invention, one merely needs to determine oxygen set point and predict the carbon dioxide level (i.e. before transport of the produce, e.g. by consulting look up tables). Ongoing oxygen monitoring and carbon dioxide removal at a predetermined rate insures that the carbon dioxide concentration does not exceed a prescribed level.

Further, none of the reference each or suggest the removal of the carbon dioxide from the container at a predetermined rate so that the equilibrium in the chamber is maintained. In all of the references, carbon dioxide is only removed on a periodic basis when detected levels exceed a

predetermined value. The advantage of the Applicant's invention over the references cited by the Examiner is that a way has been found to maintain desired carbon dioxide level without the complexity and expense of carbon dioxide monitoring.

The Examiner notes in the rejection of Claim 3 that the use of a formula derived from a mathematical model in order to calculate the amount of carbon dioxide absorbing material to be placed in the chamber is an obvious process in light of the art cited by the Examiner. In particular, the Examiner notes that Huston is directed towards providing a controlled gas atmosphere low on oxygen and high on carbon dioxide for slowing respiration of produce. The Examiner further notes that the objective is the same and any mathematical model or computation would have been obvious since the art, as taken as a whole, is aware that respiration rate, gas concentrations, temperature, etc. are all inter-related variables. The Examiner further presumes that a calculation using these variables is inherent in Huston because the goal is the same.

The Applicant disagrees with this assertion with regards to the noted claims because a system such as is described in Huston and the others noted by the Examiner, provide for controlling individual conditions based on a detected value for that condition. As is noted above, each of the references include the functionality for detecting oxygen and carbon dioxide concentrations. Because these two variables are controlled individually and simultaneously, there really is no performance prediction necessary. Conversely, in the Applicant's invention oxygen and carbon dioxide levels are also controlled independently, however only the oxygen level is actively controlled during the operation of the system. Calculations are made prior to operations with regards to a predicted amount of oxygen consumption and based on that calculation an amount of carbon dioxide absorbing materials is placed in the storage chamber. In

the cited references, no calculations are made because the prior art systems can be turned on and off based on the measured levels of carbon dioxide. In operation, the applicant's invention provides a level of flexibility for food storage, in that no special containers are needed, because conventional containers can be readily modified to carry out the method of the invention. As such in light of the amendments to the claims and the arguments made above the Examiner's rejection under 35 U.S.C. Section 103(a) is respectfully traversed.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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